

In the Claims:

1. (currently amended) A stabilized polymer composition comprising a polyolefin and an antioxidant composition for improving the long term heat stability of polyolefins, said antioxidant composition comprising:

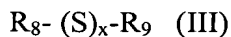
(a) ~~0,01%—0,5%~~ 0.1% - 0.5% by weight of at least one sterically hindered phenolic compound, wherein said phenolic compound contains at least one phenolic moiety of general formula (I):



wherein R_1 , R_2 , R_3 or R_4 may be the same or different and at least one of R_1 , R_2 , R_3 or R_4 is selected from the group consisting of branched alkyl having 1 to 12 carbon atoms, ~~preferably tert-butyl, iso-propyl, cyclohexyl, cyclopentyl and adamantyl~~, the others of R_1 , R_2 , R_3 or R_4 being H or lower alkyl having 1 to 6 carbon atoms;

(b) ~~0,01%—0,5%~~ 0.1% - 0.5% by weight of at least one phosphorous compound, wherein said phosphorous compound is selected from the group consisting of: [-] Tetrakis-(2,4-di-t-butylphenyl)-4,4'-biphenylen-di-phosphonite; [-]Bis(2,6-di-t-butyl-4-methylphenyl)pentaerythrityl-di-phosphite; [-]Di-stearyl-pentaerythrityl-di-phosphite; and [-]Bis(2,4-dicumylphenyl)pentaerythritol diphosphite;

(c) ~~0,01%—1%~~ 0.01 - 1.0% by weight of at least one sulphur - containing compound of general formula (III):



wherein $x = 1$ or 2 , and wherein R_8 and R_9 may be the same or different and are selected from the group consisting of C_{10} - C_{25} alkyl groups ~~optionally being substituted with C_4 — C_{12} alkyl ester carboxylates~~, wherein said % by weight values are referred to the polymer composition.

2. (currently amended) A stabilized polymer composition according to claim 1, comprising a polyolefin and an antioxidant composition, wherein said antioxidant composition comprises:

- (a) ~~0,02%—0,2%~~ 0.02% - 0.2% by weight of said at least one sterically hindered phenolic compound,
- (b) ~~0,03%—0,2%~~ 0.03% - 0.2% by weight of said at least one phosphorous compound, and
- (c) ~~0,05%—0,6%~~ 0.05% - 0.6% by weight of said at least one sulphur containing compound of general formula (III),
wherein said % by weight values are referred to the polymer composition.

3. (currently amended) A stabilized polymer composition according to claim 1, comprising a polyolefin and an antioxidant composition, wherein said antioxidant composition comprises:

- (a) ~~0,03%—0,15%~~ 0.03% - 0.15% by weight of said at least one sterically hindered phenolic compound;
- (b) ~~0,05%—0,15%~~ 0.05% - 0.15% by weight of said at least one phosphorous compound, and
- (c) ~~0,1%—0,5%~~ 0.1% - 0.5% by weight of said at least one sulphur containing compound of general formula (III),
wherein said % by weight values are referred to the polymer composition.

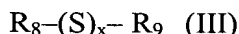
4. (currently amended) The stabilized polymer composition of ~~any of claims 1 to 3~~ claim 1, wherein the phenolic compound contains at least one phenolic moiety of general formula (Ia):



wherein R₁ and R₄ being in the 2- and 6-position of the phenol residue may be the same or different and are selected from the group consisting of ~~preferably~~ branched

C₁ to C₁₂ alkyl, ~~particularly, tert-butyl, iso-propyl, cyclohexyl, cyclopentyl and adamantyl-residues~~, R₂ and R₃ having the meaning as given before, and W is selected from C₁ to C₁₂ alkyl, C₁ to C₁₂ alkoxy, C₁ to C₁₂ alkyl carboxylate or C₁ to C₁₂ alkyl substituted by another group of the formula HO-(R₁R₂R₃R₄Phenyl)-, wherein R₁ to R₄ have the meaning as indicated before.

5. (currently amended) The stabilized polymer composition of ~~any of claims 1 to 4~~ claim 1, wherein the sulphur-containing compound of general formula (III):



is selected from Di(C₁-C₂₀)alkyl-(S)_x-di-carboxylate wherein the carboxylic acid is selected from C₁ to C₁₂ alkyl carboxylic acids.

6. (currently amended) The stabilized polymer composition of ~~any of the preceding claims~~ claim 1, wherein the sterically hindered phenolic compound is selected from the group consisting off: [-] 2,6-Di-tert-butyl-4-methyl phenol; [-] Pentaerythrityl-tetrakis(3-(3',5'-di-tert-butyl-4-hydroxyphenyl)-propionate; [-] Octadecyl 3-(3',5'-di-tert-butyl-4-hydroxyphenyl)propionate; [-] 1,3,5-Trimethyl-2,4,6-tris-(3,5-di-tert-butyl-4-hydroxyphenyl) benzene; [-] 2,2'-Thiodiethylene-bis-(3,5-di-tert-butyl-4-hydroxyphenyl)-propionate; [-] Calcium-(3,5-di-tert-butyl-4-hydroxy benzyl monoethylphosphonate); [-] 1,3,5-Tris(3',5'-di-tert-butyl-4'-hydroxybenzyl)isocyanurate; [-] Bis-(3,3-bis-(4'-hydroxy-3'-tert-butylphenyl) butanoic acid)-glycolester; [-] 4,4'-Thiobis (2-tert-butyl-5-methylphenol); [-] 2,2'-Methylene-bis(6-(1-methyl-cyclohexyl)para-cresol); [-] N,N'-hexamethylene bis(3,5-di-tert Butyl-4-hydroxy hydrocinnamamide; [-] 2,5,7,8-Tetramethyl-2(4',8',12'-trimethyltridecyl) chroman-6-ol; [-] 2,2'-Ethylidenebis(4,6-di-tert-butylphenol); [-] 1,1,3-Tris(2-methyl-4-hydroxy-5-tert-butylphenyl)butane; [-] 1,3,5-Tris(4-tert-butyl-3-hydroxy-2,6-dimethylbenzyl)-1,3,5-triazine-2,4,6-(1H,3H,5H)-trione; [-] 3,9-bis(1,1-dimethyl-2-(beta-(3-tert-butyl-4-hydroxy-5-methylphenyl)propionyloxy)ethyl)-2,4,8,10 -tetraoxaspiro(5,5)undecane; [-] 1,6-Hexanediyl-bis(3,5-bis(1,1-dimethylethyl)-4-hydroxybenzene-propaonate) ; [-] 2, 6-Di-tert-butyl-4-nonylphenol; [-] 3,5-Di-tert-butyl-4-hydroxyhydrocinnamic acid trimer with 1,3,5-tris (2-hydroxyethyl)-s-triazine-2,4,6(1H,3H,5H)- trione; [-] 4,4'-Butylidenebis(6-tert Butyl-3-methylphenol); [-] 2,2'-Methylene bis (4-methyl-6-tert-butylphenol); [-] 2,2-Bis(4-(2-(3,5-di-t-butyl-4-hydroxyhydrocinnamoyloxy))ethoxyphenyl)) propane; [-] Triethyleneglycol-bis-(3-tert-butyl-4-hydroxy-5 methylphenyl) propionate; [-] Benzenepropanoic acid, 3,5-

bis(1,1-dimethylethyl)-4-hydroxy-, C₁₃-C₁₅-branched and linear alkyl esters; [-] 6,6'-Di-tert-butyl-2,2'-thiodi-p-cresol; [-] Diethyl((3,5-bis(1,1-dimethylethyl)-4-hydroxyphenyl)methyl) phosphonate; [-] 4, 6-Bis (octylthiomethyl) o-cresol; [-] Benzenepropanoic acid, 3,5-bis(1,1-dimethylethyl)-4-hydroxy-, C₇-C₉-branched and linear alkyl esters; [-] 1,1,3-Tris[2-methyl-4-[3-(3,5-di-tert-butyl-4-hydroxyphenyl)propionyloxy]-5-tert-butylphenyl] butane; and [-] Butylated reaction product of p-cresol and dicyclopentadiene.

7. (currently amended) The stabilized polymer composition of ~~any of the preceding claims~~ claim 1, wherein the sulphur-containing compound is selected from the group consisting of: [-] Di-stearyl-thio-di-propionate; [-] Di-palmityl/stearyl-thio-di-propionate; [-] Di-lauryl-thio-di-propionate; [-] Di-tridecyl-thio-di-propionate; [-] Di-myristyl-thio-di-propionate; [-] Pentaerythritol octyl thiodipropionate; [-] Lauryl-stearyl-thio-di-propionate; [-] Di-octadecyl-disulphide; [-] Di-tert-dodecyl-disulphide and [-] Pentaerythritol-tetrakis-(3-laurylthiopropionate).

8. (currently amended) The stabilized polymer composition of ~~any of the preceding claims~~ claim 1, wherein the sterically hindered phenolic compound is selected from the group consisting of: [-] Pentaerythrityl-tetrakis(3-(3',5'-di-tert-butyl-4-hydroxyphenyl)-propionate; [-] Octadecyl 3-(3',5'-di-tert-butyl-4-hydroxyphenyl)propionate; [-] 1,3,5-Trimethyl-2,4,6-tris-(3,5-di-tert-butyl-4-hydroxyphenyl) benzene; [-] 1,3,5-Tris(3',5'-di-tert-butyl-4'-hydroxybenzyl)-isocyanurate; [-] Bis-(3,3-bis-(4'-hydroxy-3'-tert-butylphenyl)butanoic acid)-glycolester; and [-] 3,9-Bis(1,1-dimethyl-2-(beta-(3-tert-butyl-4-hydroxy-5-methylphenyl)propionyloxy)ethyl)-2,4,8,10-tetraoxaspiro (5, 5) undecane.

9. (currently amended) The stabilized polymer composition of ~~any of the preceding claims~~ claim 1, wherein the sulphur-containing compound is Di-stearyl-thio-di-propionate or Di-tert-dodecyl-disulphide.

10. (currently amended) The stabilized polymer composition of ~~any of any of the preceding claims~~ claim 1, wherein

(a) the sterically hindered phenolic compound is 1,3,5 Tris (4-tert-butyl-3-hydroxy-2,6-dimethylbenzyl)-1,3,5-triazine-2,4,6-(1H,3H,5H)-trione or pentaerythrityltetrakis(3-(3',5'-di-tert-butyl-4-hydroxyphenyl)-propionate;

(b) the phosphite compound is bis(2,4-dicumylphenyl) pentaerythritol diphosphite; and

(c) the sulphur-containing compound is Di-stearyl-thio-di-propionate.

11. (currently amended) The stabilized polymer composition of ~~any of claims 1-10~~ claim 1, wherein said composition further comprises metal deactivators and/or ~~UV-stabilisers~~ UV-stabilizers.

12. (original) The stabilized polymer composition of claim 11, wherein said UV-stabilizers are sterically hindered amines.

13. (currently amended) The stabilized polymer composition of ~~any of the preceding claims~~ claim 1, wherein said polyolefin is a homo- or copolymer of polyethylene, polypropylene and polybutadiene.

14. (currently amended) Use of the antioxidant composition as defined in ~~any of claims 1-11~~ claim 1 for reducing degradation of a polyolefin material during processing and end use of said polyolefin material.

15. (currently amended) The use of claim 14, ~~wherein the~~ for increasing long term thermal stability of the polyolefin material is increased.

16. (currently amended) Method for producing a polyolefin article having an improved long term thermal stability against ageing by radical degradation processes comprising the steps of:

(a) providing an ~~unstabilised~~ unstabilized base polyolefin material;

(b) adding to said base polyolefin material the antioxidant composition as defined in ~~any of the preceding claims~~ claim 1;

(c) converting the composition obtained in step (b) in a melt-forming process; and

(d) confectioning the polyolefin material obtained in step (c).

17. (currently amended) The method of claim 16 further comprising adding other ~~stabilisers~~ stabilizers and/or modifiers before the converting step c).

18. (currently amended) The method of ~~any of claims 16 or 17~~ claim 16, wherein the converting step c) includes injection ~~moulding~~ molding, blow-~~moulding~~ molding, rotational ~~moulding~~ molding and extrusion.

19. (currently amended) The method of ~~any of claims 16 to 18~~ claim 16, wherein the confectioning step d) includes cutting, lamination and/or welding.

20. (currently amended) Polyolefin article having an increased long term ageing stability obtained by the method of ~~any of claims 20-23~~ claim 16.

21. (new) The stabilized polymer composition of claim 1, wherein the branched alkyl having 1 to 12 carbon atoms is selected from tert-butyl, iso-propyl, cyclohexyl, cyclopentyl, and adamantyl.

22. (new) The stabilized polymer composition of claim 1, wherein R₈ and R₉ are optionally substituted with C₁ - C₁₂ alkyl ester carboxylates.

23. (new) The stabilized polymer composition of claim 4, wherein the branched alkyl having 1 to 12 carbon atoms is selected from tert-butyl, iso-propyl, cyclohexyl, cyclopentyl, and adamantyl.

24. (new) The method of claim 17, wherein the converting step c) includes injection molding, blow-molding, rotational molding and extrusion.

25. (new) The method of claim 17, wherein the confectioning step d) includes cutting, lamination and/or welding.

26. (new) The method of claim 18, wherein the confectioning step d) includes cutting, lamination and/or welding.

27. (new) Polyolefin article having an increased long term ageing stability obtained by the method of claim 17.

28.(new) Polyolefin article having an increased long term ageing stability obtained by the method of claim 18.

29. (new) Polyolefin article having an increased long term ageing stability obtained by the method of claim 19.